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SOME
OBSERVATIONS
ON
THAT DISTEMPER IN TIMBER
CALLED
THE DRY ROT.

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OBSERVATIONS, &c.

SOME years ago having unadviſedly purchaſed a houſe in which there was much decayed timber, and afterwards finding this was juſtly attributed to what is called the *dry rot*, I have had ſufficient reaſons for attending to that diſtemper. When I firſt ſaw the miſchief done, I was ſo entirely ignorant, that I had no other apprehenſions, than ſuch as aroſe from a calculation of the immediate expence of repairing it; but have ſince found *that* to have been a ſmall part of the conſideration. Though the following remarks convey a very imperfect idea of a ſubject hitherto much neglected, I hope they may be the means of inciting better informed men to conſider it*; and if any method of preventing or curing the diſtemper ſhould be diſcovered, great inconveniences and heavy expences would be ſaved to the owners or inhabitants of ſuch houſes. Much ſatisfaction would alſo reſult to my own mind, if, by my error, others may be reſcued from ſuch detriment.

In *Leviticus*, chap. xiv. there is an account of the leproſy of a houſe, which ſeems to have been the *dry rot*, and I muſt beg leave to take notice of the paſſage. It is there deſcribed as "a plague in the walls of the houſe, with hollow ſtrakes, greeniſh or reddiſh, which in ſight are lower than the ground." The means directed for its cure are, to take away all the diſtempered parts, by removing the ſtones affected, and ſcraping

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* When theſe ſheets were ready for the preſs, I was informed that the *Society of Arts* had offered *premiums* for the diſcovery of a method of preventing and curing the *dry rot*, and that ſome obſervations on that ſubject had been publiſhed in their Tranſactions.

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the walls within and without, carrying the corrupted materials to a place without the city. If after a certain time the diſtemper was found to return, it was called a ſpreading leproſy; the prieſt was enjoined to deſtroy the houſe, and the materials with which it had been built, were never to be uſed again for the ſame purpoſe.

I ſhall not make any obſervations on the devotional part of the ceremony, but it appears that the Jews ſuſpected the diſtemper to originate from the ground, though they only removed the infected parts; that running water was uſed in the ceremony; that the old materials of ſuch houſes were never uſed again; and that ſuch houſes were conſidered as unhealthy and dangerous to the inhabitants; but for the laſt opinion, as far as I know or have ſeen, there is no foundation.

Had I time to conſult a variety of authors,

thors, I might probably find many other remarks relating to this ſubject. But in truth, what I have to ſay will be chiefly compoſed of ſuch obſervations or conjectures as have occurred to me from ſeeing the ſtate and progreſs of the diſtemper in my own houſe, of which I may be allowed to ſpeak plainly, or of ſuch as I have collected by inquiry, or in converſation; and there is much reaſon to ſuſpect that the care generally taken to conceal the knowledge of the diſtemper, when it exiſted in a houſe, has been one of the principal cauſes why we do not at preſent know more of the *dry rot*. I find alſo, that the little which is known on this ſubject by artificers, is often concealed by them with much affectation of importance.

Perhaps the beſt method of acquiring any accurate knowledge of this diſtemper would be, Firſt, to ſtudy the general nature of the ſoil in which houſes affected with the *dry rot* are built.

Secondly, the accidental or adventitious cauſes of the *dry rot.*

Thirdly, the effect of the *dry rot* on different kinds of *ſtone*, and other hard materials uſed in building.

Fourthly, the effect of the *dry rot* on timber, and the kinds of timber moſt readily affected by it.

To theſe might be added, miſcellaneous obſervations, containing an account of the peculiar effects of the *dry rot* in certain ſituations; and of the means uſed, with or without ſucceſs, for preventing, or curing timber affected with, the diſtemper. It is not without the greateſt diffidence that I mention this arrangement, from a conſciouſneſs of the very imperfect manner in which I have been able to execute my own deſign; but

many

many allowances will be made for the firſt eſſay on any ſubject.

My houſe is ſituated on the north ſide of *Sunbury* common, which, though a flat, is called a *hill*, I ſuppoſe, as *lucus a non lucendo*, but it is ſo named in *Speed's* map of the county. During the winter, if there happens to be much rain, a conſiderable part of the common is covered with water, not only in the pits which have been occaſionally made, but from the mere level of the common; and in times paſt it is not unlikely but a great part of it may have been overflowed by the *Thames*, which is not far diſtant. The floods in the year 1774, and in the laſt winter, roſe enormouſly high, and though, ſtrictly ſpeaking, they did not reach the common, from the amendment of the channel of the river by its navigation, and by the banks being raiſed where the nature of the ground would allow of it, they made great devaſtation in many of the neighbouring parts. But the conſtitution of the ſoil is ſuch, that the water is ſoon drained through the gravel, ſo that the common, except in particular ſpots, is not ſwampy, nor ruſhy, nor moſſy, but covered with heath and gorſe, or a fine turf, as is the caſe in almoſt all healthy, but uncultivated land. The common, though ſomewhat lower and flatter, is not unlike that of the vaſt tract of land, *Hounſlow* heath. Scarcely any trees grow upon the common, but in the appropriated parts there is no difficulty in raiſing them. At *Littleton*, the highly reſpected owner, now in the eighty-ſeventh year of his age, has had the ſatiſfaction of planting and ſeeing many a fine tree flouriſh; and at *Kempton*, the laſt reſidence of the famous *Sir John Chardin*, which adjoins, and is nearly on a level with the common, there is an abundance of very fine trees, oaks, elms, beeches, walnuts, &c.; which have not only arrived at their full growth, but are many of them of a century's ſtanding. One of my neighbours aſſured me, that ſome cupmoſs oaks which he planted on the common two years ago, have in that time ſhot more than ſeven feet. I therefore conclude that the principle of vegetation is generally vigorous and healthy over the common, though elms ſeem to be the favourites of the ſoil, and it has been ſaid that none of the tribe of firs acquire their full growth or beauty, and that they do not endure their accuſtomed time. There is nothing apparent in the nature of the ſoil which ſhould render houſes built upon it ſubject to the *dry rot*, though patches of it may be altered or corrupted by the long lodgment of water upon them, or by being made conſtantly damp from imperfectly erupted ſprings. It is reaſonable to believe if a houſe be built on ground ever ſo pure, but was in its ſite to include one patch that was depraved, the *dry rot* might be produced in one part of the houſe, though every other part were perfectly healthy.

The houſe I purchaſed has been built upwards of fifty years, but for the laſt twenty-five, though always inhabited, had been grievouſly neglected. When I took poſſeſſion of it, there was a great quantity of rotten timber in various parts of it. When the roof was taken off, the plates and breſſumers were found decayed; when the wainſcot was removed, the ends of the beams were in the ſame ſtate; and the farther we proceeded, the more diſcouraging every thing appeared. I now believe it would have been wiſe to have taken out the whole inſide of the houſe, though it was then judged better to repair. By time and perſeverance all the difficulties were overcome, and when the houſe was made habitable, I had time to review what was paſt, and the mortifying opportunity of obſerving the future progreſs of a diſtemper, the effects of which had for the preſent been removed, but which ſoon ſhewed a diſpoſition to return.

Care was, however, taken in repairing to uſe as little wood as poſſible in thoſe parts which had moſt ſuffered before. The entrance, inſtead of being wainſcotted, was ſtuccoed (but abſurdly enough, a ſkirting-board was added), and wherever it was neceſſary to ſet *uprights*, the floor was paved with ſtone as a ſecurity. One ſmall room which was very much affected, after taking up a part of the floor, and ſtripping off the lining, I have yet ſuffered to remain in the ſame ſtate, from a perſuaſion that the diſtemper would be reproduced if it were immediately repaired.

There has ſince been no token of the *rot* in any of the upper parts of the houſe, but the entrance, which is paved with *Portland* ſtone, and which is conſtantly expoſed to a current of open air in different directions, the doorpoſts of an inner door, dividing the fore from the back entrance into the houſe, are entirely decayed, with ſome part of the ſkirting boards, though other parts are perfectly ſound; the decayed and the ſound not being many feet aſunder. On thoſe parts of the floor where the wood which ſtands upon it is decayed, the ſtones are perpetually damp in every kind of weather, and the wood univerſally began to decay at that part neareſt the ground. From theſe premiſes, ſupported by other obſervations, I have ventured to draw theſe concluſions. 1. That the cauſe of the *rot* in timber is derived from the ground. 2. That the ground which produces this diſtemper is always damp. 3. That the ſtone moſt commonly uſed for paving floors does not intercept the cauſe of the *rot*.

What chymical alterations may have taken place between healthy and diſtempered ground, before this becomes capable of producing the *rot*, I cannot tell, though in a full inveſtigation of the ſubject it would be neceſſary to inquire. The mechanical effect of theſe is perpetual dampneſs, and the rotted earth found in ſinks and ſuch places gives me a notion of it. This earth I preſume, is become, by the changes it has undergone, from ſome principle perhaps analogous to fermentation, deprived of its natural powers of vegetation, which it might recover by being expoſed to the air, or by admixture with other bodies. For the preſent ſuch earth has acquired the property of producing the *rot*, which, as far as I know, may be a perverted vegetation, and till we have diſcovered a method of altering its preſent qualities or correcting its influence, the only effectual remedy for preventing the *rot* will be, *to remove ſuch diſtempered ground.* When this ground is removed, and drains made if thought needful, the vacuity ſhould be filled up with ſome healthy ſubſtance not ſuſceptible of the diſtemper, ſuch as broken glaſs, clean pebbles, a portion of unſlaked lime, the refuſe of vitriol works, and the like; but we ſhould remove all the diſcoloured ground, and not ſatisfy ourſelves with a layer or thin coat of theſe ſubſtances.

Perhaps the nature of this diſtempered ground may ſometime be diſcovered by knowing what it is not. I found a wooden ſtable on my premiſes, built in the uſual manner, with a frame, an outſide covering of deal boards featheredged, and a lining of flat unpainted boards. This had ſtood more than fifty years, and when it was taken down, though the timbers were wormeaten and decayed, there was no token of the *rot* throughout the building. Frames of cucumber and melon beds, though in conſtant uſe, and ſtanding on a ſubſtance that might be ſuſpected as likely enough to produce the *rot*, will endure for many years, and at laſt periſh, without any tokens of this diſtemper; one might therefore conjecture that animal ſubſtances of this kind do not generate the *rot*.

Objections may be made to the opinion of the *rot* proceeding univerſally from the ground, becauſe it has been diſcovered in parts of houſes which had no direct communication with the ground, the intermediate timber being clear, as in garrets and particular parts of houſes. At the firſt view this ſhould have originated in the timber itſelf, or in ſome ſubſtance with which that was in contact or had a direct communication. This happened in the houſe of one of my friends, who is a very competent judge of the fact. He one day obſerved a ſingle pannel which was cracked, on the wall ſide of his drawing-room, exhibiting tokens of the *rot*, though every other part of the houſe was clear of the diſtemper. On removing this pannel he found a large cake of the fungous web, which accompanies the *rot*, filling the ſpace between the pannel and the wall; but tracing this, he was led to the water-pipe, which ſome time before having been choaked, the water had regurgitated over the ciſtern of the pipe, and flowed on the outſide of the wall to the ground. This had continued ſo long, or been repeated ſo often, that oppoſite to the injured pannel it had waſhed out the mortar, and ſoaked through the wall itſelf, till the oppoſed pannel became affected with the *rot*. This brings us back to diſtempered ground, and a moment's conſideration will ſhew how readily this may happen in garrets, in which the ſoaking of water is diſregarded if it does not deſcend to the principal rooms. It will not however be hence ſuppoſed that all moiſt ground is capable or diſpoſed to produce the *rot*, but ground ſo corrupted by continued ſtagnating moiſture, as to become deprived of its natural properties, and to have acquired a perverted principle of vegetation; or a power of giving to wood ſuch a property as ſhall generate the proceſs by which the *rot* is produced. On inquiry it will probably be found that there is a great difference between the moiſture given to wood by ſtagnating or running water, and between ſimple moiſture, and moiſture mixed with corrupted ſubſtances. It is alſo to be remembered, though the wood neareſt the ground firſt begins to decay, that the infection will ſoon ſpread to a diſtant and healthy part, if there be a medium of communication by which it can be conveyed.

In every neglected or uninhabited houſe, if the pipes be choaked and overflow,

flow, the water running between the wall and the wainſcot may eſcape to the ground, and if it has a proper drain, do no miſchief. But if there be a repetition of theſe overflowings, ſo that any piece of timber becomes ſoaked in the paſſage of this water mixed with the ſweepings of the roof, in a place not expoſed to the air; or if the water ſhould reſt afterwards on a ſpot of ground with which timber comes into contact, the *rot* may begin in this one part, and then ſpread its devaſtation around. Thus the foundation of a general *rot* in the timber of a houſe may be laid by neglecting its firſt appearance. But this kind of *rot* admits of a certain cure if it be undertaken in a proper time, and the method effectually completed. Yet the firſt expence is ſometimes ſo great that people are willing to leſſen or evade it, if they can find any plauſible reaſon to ſatisfy their minds. But this is very bad huſbandry. There is a very handſome houſe in one of the ſtreets leading to *Groſvenor Square*, which was ſo greatly and repeatedly infeſted with the *rot*, that the owner ſold it, for this reaſon alone, far below its real value. It was then purchaſed by a nobleman who underſtood more of the diſtemper, or uſed more effectual means for curing it, which ſucceeded, as I am informed it is now free, the nobleman at the preſent time living in it, and it is ſuppoſed to be worth three times the ſum it coſt him. I preſume that the *rot* in this houſe was merely cauſed by the overflowing of the pipes, which might at length have produced the diſtemper, perhaps ſome years after the circumſtance was forgotten, no other houſes in that ſtreet having the *rot*. It ſhould be remarked, though I do not know that it is of much conſequence, that the *rot* ASCENDS from the part where it was formed, and does not deſcend or ſpread much laterally.

In ſome houſes the *rot* has been attributed to air corrupted, or acquiring chymical properties deſtructive to timber, from its mere confinement, without the mixture of any other ſubſtance, or any exhalation from the ground. If common air by confinement alone acquired the property of producing the *rot*, certainly very few houſes could be free from it, becauſe there is in every one ſome place or other of this deſcription. But this opinion is very much to be doubted, and it is probable the miſtake might ariſe from the timber having gone through the firſt part of its proceſs without notice, till the wood, by cracking or being in a mouldering ſtate, drew attention. But when the genuine cauſe of the *rot* exiſts, the progreſs will be more rapid in a confined than an open place; though my door poſts, expoſed to the open air in two directions, have decayed in about three years, and they are not fixed in the ground, but on a ſtone pavement.

There is uſually no area round houſes built in the country, or rather, many are built without one. In certain ſituations, if the ground be much higher at the back than the front of the houſe, the diſadvantage is ſoon evident from the dampneſs and diſcoloration of the wall, eſpecially if it be covered with ſtucco or plaiſter, whether or not the *dry rot* ſhould be produced, as well as in the general look of the houſe, which is apt to become ſtraked with green, and moſſy. It is certainly beſt, on many accounts, to have an area, if poſſible, to all houſes; for, though healthy earth lying againſt the walls of a houſe, will not, I apprehend, produce the *rot*, much is to be apprehended from tainted or diſtempered earth. I adviſed a gentleman in *Worceſterſhire*, who applied for my opinion on account of the unhealthineſs of the cottagers in his neighbourhood, to have a trench or drain round every cottage, that no more water might lodge than fell within the ſite, and to have back as well as front windows for the purpoſe of ventilating them. For this purpoſe it is alſo much better, and not more expenſive, to have ſliding windows or ſaſhes. But this is a digreſſion, though on a ſubject which has very much engaged the attention of a lady diſtinguiſhed by her genius and her humanity.

If the part of a houſe affected with the *rot* be near the outer wall, probably a ſough or drain would be of much ſervice, and the wall might, without damage, be perforated, and then the cauſe of the damp would be more effectually removed.

Stone often becomes affected with this diſtemper, of which I had for a long time no ſuſpicion, and, as was before obſerved, the ſofter kinds do not intercept the cauſe as it riſes from the ground. There are various kinds of ſtone uſed for pavements, the moſt common of which is the *Portland*; next to this is the *Purbeck*, taken from the ſame quarry, but of a harder texture, perhaps becauſe it has been longer formed, or more expoſed to the air; then the *Yorkſhire* ſlab, not ſo pleaſant, but harder than the *Purbeck*; and there is likewiſe in uſe a red ſtone cut into ſquares or lozenges, brought from *Bremen*, and a blue ſtone of a ſimilar kind, but ſomewhat harder, from *Sweden*.

My entrance is paved with pretty large ſlabs of *Portland* ſtone, which is conſtantly damp in that part where the *rot* has again appeared; and it is ſpotted with white blotches not unlike leprous ſpots upon the ſkin; and by theſe appearances I can with eaſe trace the extent and progreſs of the *rot*. In the ſawing of ſtone which might be pretty dry when it was ſubmitted to the inſtrument, ſo much water is uſed, and for ſo conſiderable a ſpace of time, that the ſtone is thoroughly ſoaked; and it is the cuſtom to lay down the ſtone while in this ſtate, to which the ſame objection may be made as in timber newly worked up, and immediately painted; of the reaſons for which we ſhall afterward take notice. But the dampneſs of the ſtones before obſerved, is not occaſioned by the moiſture with which it was imbued before they were laid down; for though they were all cut at the ſame time, and many of the ſlabs from the ſame block, none are now diſcoloured or ſhaded with the damp, but thoſe which are placed where the *rot* exiſts. It is therefore reaſonable to think that they have not retained their original moiſture, but that they are become moiſt from the peculiar influence of the ground on which they are laid.

I think however that I have ſeen ſtones with ſlight marks of the kind above mentioned when they were firſt cut, and thence conjecture that the diſpoſition to decay may originate in the quarry, from earth inſinuated between the *laminæ* of the ſtone, or from ſome other cauſe, becoming corrupted. If ſtones with theſe marks are laid on healthy ground, or uſed as ſteps where they are ſurrounded by the air and kept dry, the ſpots do not, I think, increaſe in number or ſize. But if ſuch ſtones were to be laid on diſtempered ground, though they might not immediately give riſe to the diſtemper in other materials, they would be more ſuſceptible of it, and more readily convey it than if they had been originally healthy. In houſes built or faced with ſtone, I have alſo often ſeen ſtones with ſuch tokens of imperfection, and they are the firſt to decay. In that beautiful houſe of Mr.

Milnes, in *Piccadilly*, many of the facing ſtones have decayed with ſuch marks upon them, and ſome of thoſe newly put up, have them. Yet it muſt be remembered that the more ſpeedy decay of ſome ſtones may alſo depend upon other cauſes, ſuch as their being cut or placed in a wrong direction.

The *Purbeck* ſtone is of the ſame texture, and has the ſame properties, as the *Portland*, though harder; and it is on this account leſs ſuſceptible of impreſſions from the cauſe of the *rot*. The *Yorkſhire* ſlab is very hardy, and compoſed of different ſubſtances as well as different in its texture; of courſe it is fitter for hazardous ſituations. The red ſtone imbibes the moiſture freely, and conducts the diſtemper, which makes it flake; as does likewiſe, I underſtand, the blue ſtone, though in a leſs degree. Gritſtone, which ſeems to be compoſed of diſtinct granulations, would probably ſuit very well, and for paſſages, eſpecially thoſe below the ground; the granite, now commonly uſed for paving the ſtreets, would make a ſufficiently convenient and durable pavement. But all ſtone eaſy to cut, either from the ſoftneſs of its ſubſtance, or the ſpongineſs of its texture, ſeems improper in every place liable to the *rot*.

This diſtemper ſeems to have no effect upon brick walls or on bricks, provided they are well burnt, and layed with good mortar, farther than from the ſimple effect of moiſture; but ſoft bricks, or bad mortar, when operated upon by conſtant damps, have been ſuppoſed to give a rooting place to it. Though it does not penetrate into the ſubſtance of a brick wall, the *fungous* wall may often be ſeen mantling over its ſurface, yet without hurting it. But if it chance to meet any wood in its paſſage, there it fixes and ſeems to acquire freſh vigour, if there be any degree of moiſture, but not in abſolutely dry places. As bricks are found not to be affected with the *rot* or its cauſe, the obſervation may on various occaſions be turned to good account, by ſaving the uſe of timber, in places where it might be expected ſpeedily to decay. Store rooms of every kind might be more ſuitably fitted up, and with ſome ornament, with rubbed or glazed bricks of different forms, in the manner of Mr. *Cartwright*'s patent ones; or with tiles of various kinds and colours. The houſe in the ſouth-weſt corner of *Hanover-ſquare* is a beautiful example of fine brick work; and the faſhion of making paper to imitate brick, is a proof that it would not offend.

Stucco, and plaſter of the coarſer kinds, ſeem to ſuffer no injury from the *rot*, (notwithſtanding the flagrant negligence with which mortar of every kind is mixed) except from ſimple moiſture.

When theſe are laid on walls, there is no occaſion to conſider the ſubject as far as they are concerned, but when, for the purpoſe of making plaiſter partitions in dangerous places, it is neceſſary to ſet up ſtancheons, or to uſe laths, theſe will ſoon decay, and then the partitions fail. Inſtead of ſuch work, the expence of raiſing a brick partition in the firſt inſtance, when we are not ſure that the earth is ſound, will on the whole be the leaſt, and the work far moſt permanent.

The injury done to ſtone does not, however, render it unfit for the purpoſes for which it was deſigned, and many years would paſs before it were actually ſo decayed as to moulder, though it might be blemiſhed to the eye. The principal misfortune to a building is when timber is affected, becauſe of the repeated trouble, and the expence of repairing it.

The manner and the time in which

each particular kind of timber naturally decays, is now pretty well underſtood. The conſtituent parts of which it is compoſed loſe their connection, but preſerve their form, in ſuch a manner that each kind, though wholly decayed, may be diſtinguiſhed. But in the *rot*, the very form or internal ſtructure is deſtroyed, ſo as to render them all nearly alike. The wood becomes moiſt, decays, ſhrivels, then cracks and breaks as if it had been parched by lying for a long time near a ſtrong fire, or as if it had been ſoaked in ſome deſtructive liquor.

In places affected with the *rot*, the wood next the ground will certainly firſt decay. Skirting-boards, which are in fact neither uſeful nor ornamental, and which are always made of ſlight boards, exhibit their tokens by becoming ſpotted or producing the *fungus*, eſpecially at their junction with each other; the mouldings, if there be any, round the doors; then the ſteppings of joiſts, door, and other poſts, of whatever kind. I alſo obſerve if two pieces of wood are joined together, that the diſtemper makes a quicker progreſs, by running between the united ſurfaces, than in one piece of equal dimenſions. The ſlighteſt work is always firſt affected.

Different cauſes taken from the timber itſelf have been aſſigned for this diſtemper. Some have ſuppoſed that timber cut from trees which grew in certain ſituations was peculiarly liable to the *rot*, thoſe which were taken from very moiſt ſituations being judged to have the greateſt propenſity to it; and the lower parts of *Eſſex* have been expreſsly mentioned on this occaſion. There may be ſome truth in this as a general reaſon, becauſe oak, or any other timber, growing in *America* or *Britain*, for inſtance, may vary in the time of its natural duration. Yet the miſchief ariſing from this cauſe will be ſo ſlow in its operation as to be hardly perceptible, if it ſhould even amount to one quarter of its time, unleſs it were employed on ſome particular and equal ſervice. No timber of any kind has however the power of withſtanding the *rot*; they all yield to its influence, ſcarcely varying in any other reſpect than the time of enduring its effect.

With regard to the natural duration of timber, I believe it has been proved, that much depends on the time of barking and felling trees; the time they are kept after they are felled before they are worked up; the manner of keeping them; and the time which paſſes before they are uſed, when ſawed or cut into planks or beams. It has even been aſſerted, that a moiety of their duration depends on theſe circumſtances; and for theſe reaſons, perhaps, mahogany is ſo ſtout and laſting a timber. The age of the tree when felled may alſo be of great importance. But unfortunately it is the cuſtom to neglect all theſe points in timber uſed in buildings, eſpecially as ſo great a number have been raiſed within a very few years. Even the moſt valuable oaks have been managed ſo that when they are filled, the bark ſhall eaſily peel, and be ready for the beſt market, with the view of ſaving the intereſt, or of procuring a quick return of money; and trees cut down in one ſeaſon have been, without heſitation, worked up in the enſuing year, making the goodneſs or badneſs of the timber, provided it appeared well, a matter of ſecondary conſideration. For the purpoſe of working more eaſily, and perhaps of meaſuring better, the fir beams, ſtored by the timber merchants, are generally kept ſoaked in water till they are ſawed and prepared for their ſpecific uſes; and then they are forthwith fixed in buildings, long before the moiſture they had acquired can be exhaled. Hence may be explained that ſhrinking of the floors and wainſcotting ſo obvious in all the new-built houſes; though I underſtand that all timber, however well preſerved, newly worked, has for a certain time a tendency to ſhrink, in a ſmall degree.

In ſhip-building, in which the greateſt poſſible care is taken to preſerve and work the timber when in its moſt perfect ſtate, it is a rule carefully to chooſe the proper time of barking and felling the oaks, of keeping them till the native moiſture be exhaled, of ſoaking the timber, and again keeping it in a dry place, even within the influence of the fire, for a long time before it is worked, and then again after the planks and timbers are formed for expreſs purpoſes; and it will ſcarcely be believed how great the difference is, between ſhips built with theſe precautions and thoſe in which they are neglected. How far ſuch obſervations may apply to timber uſed in buildings, I cannot tell, though it is reaſonable to think that whatever accelerates the natural decay, may diſpoſe to the *rot*, or at leaſt render it a more ſpeedy victim in infected places; ſo that ſome attention ought to be paid to theſe matters, with timber intended for buildings.

The propenſity in timber to be infected with the *rot*, and its ſpeedy decay when affected, certainly very much depend alſo on the looſeneſs or cloſeneſs of its texture, and for this reaſon fir is the leaſt eligible, though of late it is almoſt the only kind uſed in buildings; and it would be difficult to provide any other in a ſufficient quantity. But of the reſpective or comparative goodneſs of all the other kinds of timber for particular uſes, I am unable to judge. There is another obvious reaſon alſo why the ſteppings of poſts and uprights ſhould ſoon decay, beſides their touching the ground, from which the infection of the *rot* is received. The end of every poſt is ſawed off, and if this be done with a coarſe inſtrument, it is left ſpongy, with the longitudinal fibres ſhook or broken a conſiderable way within the extremity of the wood. In this ſtate the ends of the poſts muſt be apt to abſorb from the ground the pernicious moiſture or exhalation, which being retained, and ſpeedily pervading the whole internal ſubſtance, this may be rotted, while the external ſurface, eſpecially if painted, appears to be perfect. Artificers can tell by the ſound of any ſubſtance whether it be healthy or decayed, as accurately as a muſician can diſtinguiſh his notes. Thus a bricklayer ſtrikes a wall with his crow, and a carpenter a piece of timber with his hammer. Timber affected with the *rot*, yields a particular ſound when ſtruck, but if it were painted, and the diſtemper had made much progreſs, with no ſevere ſtroke the outſide breaks like a ſhell.

I am pretty certain that in ſituations obnoxious to this diſtemper, painting forwards its progreſs, and probably in this manner. If the moiſture be abſorbed from the ground into painted wood, it will be confined there, the paint when dry forming a cruſt, which prevents every degree of exhalation, depriving, at the ſame time, the wood of the ſalutary influence of the open air; and the moiſture thus abſorbed runs through, and inſidiouſly deſtroys the whole ſubſtance. But if the wood were not painted, ſome portion of the moiſture would exhale to the ſurface, and be diſſolved by the circumambient air. If there were flaws or junctures in the wood, the *rot* might ſhew itſelf ſooner, but the decay of the wood would be ſlower.

In ſome ſituations wooden poſts fixed

in the ground ſpeedily decay, not perhaps by the *rot*, but by ſome property of the ground accelerating its natural decay. To prevent this, it is cuſtomary to dip the ends in melted pitch, or to give them two or three heavy coats of tar; but many have doubted the efficacy or propriety of this method. It is clear that in fixing the poſts, ſome part of any brittle matter muſt be ſhivered off, and a ſmall vacancy may admit the miſchief; or if any moiſture ſhould inſinuate between the coat and the wood, the injury might be forwarded, and not prevented. An apparently more reaſonable method, much practiſed alſo, is, to ſcorch the foot of the poſt in ſuch a manner that the outſide texture may become harder and cloſer from the ſhrivelling of the wood; as the *Indians* burn the points of their ſpears, giving to them by that method almoſt the hardneſs and ſharpneſs of metal. It is remarkable that in fir deſtroyed by the *rot*, there is not the leaſt remnant or veſtige of reſin or turpentine, which in fact ſeems to be the ſubſtance firſt preyed upon. From theſe premiſes we may preſume to come to another concluſion, that in places ſubject to the *rot*, *fir is the moſt unfit kind of timber to be uſed*; and perhaps to another, that timber fixed in ſuch places, *ſhould ſtand a year or more before it is painted*, or *that it never ſhould be painted.* There is one pannelled room in this town, which was never painted, and inſtead of offending, it is rather agreeable to the eye.

In hazardous places, it would be a great preſervative to poſts fixed within doors, if the communication between them and the ground were to be cut off by ſome ſubſtance that could ſuſtain no injury, or which would not convey the *rot*. Thin plates of iron or tin, firſt occurred to me as moſt ſuitable to this purpoſe; but probably a plate of ſheet lead, of a proper ſize, would anſwer better.

In the counting-houſe of a merchant in the city, the wood was very ſubject to the *rot*, and in order to cure it, a brick arch was thrown underneath the counting-houſe and over a cellar, but after a certain time the diſtemper returned, though it was leſs rapid in its progreſs. In this caſe I ſuſpect that the arch of the vault was covered with the rubbiſh of the old corrupted materials, or other unwholeſome ſtuff. Had this been covered with broken glaſs or clean pebbles, or been covered with good mortar, or had a brick floor been run over the arch, or had the room been ſet over the arch, upon caſt-iron piles, I apprehend the diſtemper would have been prevented.

In the courſe of this ſummer a perſon diſcovered the floor of a ſitting parlour to be almoſt wholly deſtroyed by the *rot*. When the floor was taken up, an immenſe quantity of the fungous web, which ever accompanies the *rot*, was found between the floor and the ground.

To prevent the diſtemper in future, the ground was paved with ſtone, and the new floor laid upon the pavement. It remains to be proved whether the diſtemper will return; but unleſs the ſtones were hard and ſound, and laid ſo accurately as to interrupt all communication with the ground, I ſuſpect it will. All the tainted ground ſhould have been cleared away, and the vacuity filled up with healthy materials, void, if ſuch could be procured, of all vegetating principle; or if this could not have been done, it would have been better to have made the pavement with hard, glazed, or vitrified bricks, ſet in a thick bed of freſh mortar, or terrace, than with any kind of ſtone.

Dryneſs and warmth ſeem at the firſt view, as if they would greatly reſiſt, if not perfectly aboliſh, this diſtemper. Theſe relate to the air, unleſs by a great degree of heat the moiſture of the earth or ſtones could be abſolutely done away, or the quality of the earth changed by actual burning, or perhaps by a free uſe of quick lime, which would produce an equivalent effect. I have lately heard of two accounts which go againſt this opinion, but one of them is taken from the newſpapers. The hearth ſtone, of a very large ſize, in a kitchen, was ſaid to be raiſed out of its bed by a vaſt number of ſmall *fungi* growing underneath. This caſe is imperfect, as it did not appear whether this circumſtance was local, or whether any other part of this houſe was infected with the *rot*; but it ſhews that a very conſiderable degree of heat does not hinder the generation of *fungi*, which invariably make a part of the *rot*, though it would be preſuming too much to ſay that all ground diſpoſed to produce every kind of *fungus*, is infected with the *rot*. In the houſe of a friend of mine the ends of the beams which ſupport the floor of a parlour over a kitchen in conſtant uſe, were affected within the wall to ſuch a degree, that the floor was very near falling into the kitchen. On inquiry I found that the ſame circumſtance had happened a few years ago, when the houſe was repaired at a great expence. This is not only a proof that ſimple warmth does not prevent the *rot*, but of the inſidious manner alſo in which this ſometimes makes its progreſs.

In ſome diſtricts one certainly hears of many inſtances of the *rot*, while in others there is a total exemption from it. I very much doubt whether this diſtemper has ever been heard of in many parts of the country, though in others the value of property (in houſes) is very much debaſed by it. All this may be reconciled to the idea of native ground, uncorrupted, not producing the *rot*, by ſuppoſing that the face of a country has been partially or generally very much altered by accidental cauſes, that theſe may have occurred more frequently in ſome places than in others, or that ſome native ſoils may from ſlight cauſes, be more prone to produce the *rot* than others. I have heard it aſſerted that in ſome parts, fruit trees, eſpecially thoſe of the more delicate kinds, become affected with a diſtemper which in ſeven or eight years deſtroys them. This has by ſome been aſſigned to the importation of diſtempers with foreign trees. The leaves, or ſomething blown from the *Lombardy* poplar, are ſuſpected to be particularly injurious to fruit trees; but theſe are both in management and culture *ab origine*, rendered ſo artificial, that one is not ſurpriſed with any new diſpoſition they may acquire. In a very handſome avenue of elms which leads to the houſe of one of my friends, and which was planted about ſixty years ago, though the trees are full grown and appear generally healthy, of late, every two or three years, one of them has failed. They firſt ceaſe to bear leaves, the bark becomes diſcoloured, and between this and the bole there are an infinite number of inſects, probably not the cauſe, but conſequence or effect of the decay; intimating alſo the parts firſt diſtempered. It was propoſed to cut off the tap root to preſerve the reſt, on the common notion, that when this dips beyond a certain depth, it may reach a bed of ſomething noxious which it imbibes and conveys to the tree. But on inquiry the tap root was found to have been already cut, and a flooring of bricks laid to prevent its regeneration. It ſeems from this precaution that former trees had ſuffered in the ſame manner; or perhaps this method had been practiſed to make the trees grow faſter at the expence of their duration, as was done, according to the account given by a traveller, with the avenues leading to one of the palaces in *Spain*, which prematurely growing, ſoon decayed. In the firſt deſcription of *Botany Bay*, it is ſaid that many of the trees appeared as if they had been ſtruck by lightning, though it is poſſible this might be attributed to ſimilar cauſes with the trees to which we have here alluded. In *St. James's Park* there are at all times examples of trees with this appearance. In ſome *Spaniſh* plane trees, planted near the new lodge in the Green Park, there is at this moment a very curious circumſtance. The outer bark of every tree is ſcaled off, but whether it be a morbid or natural effect in that kind of tree I cannot tell, though I was told it occurred annually in trees of this kind.

The *rot* has appeared in ſome churches, and in one the progreſs has been ſo ſpeedy, and the neceſſity of repairing ſo frequent, as to create a grievous expence to the pariſhioners. Here it will often be impoſſible, or, which is nearly the ſame thing, improper to remove the ground, though diſpoſed to produce the *rot*; yet I think it might be prevented by the following method. The pews ſeem to be the principal parts which can be infected, and inſtead of flooring them on the ground, I ſhould propoſe, that two or more of theſe ſhould be built on one frame, which inſtead of reſting on the ground, ſhould ſtand on a proper number of caſt iron piles or caſters, by which the communication with the ground or wall would be hindered; and if the conjecture of the cauſe of the *rot* be juſt, the pews would eſcape any injury. But to render the ſucceſs more certain, it would alſo be proper to pave the ground with ſome firm ſtone or hard bricks. For the houſes of the parochial clergy in ſituations ſubject to the *rot*, I have a notion there is a ſaving clauſe with reſpect to dilapidations, but the expence muſt fall ſomewhere, or the houſes would come down. If an incumbent ſhould arrive at old age, keeping ſuch a houſe in comfortable repair, would in his life-time be a terrible deduction from the profits of any living.

The *rot*, as far as I know, *does not affect metals* farther than as common moiſture, and no metallic ſubſtance will conduct the *rot*. It is curious to ſee a door perfectly ſound hanging on a poſt ſo much decayed, that it would not bear new ſtaples or hinges to be fixed. This muſt ariſe from the interruption of all communication with the decayed poſt by the hinges, on which the *rot* cannot make any impreſſion, or which it cannot paſs, or by which its peculiar quality will be corrected.

Cloſe to the houſes of many gentlemen, for the purpoſe of levelling or raiſing the ground, it is often neceſſary to bring materials from ſome other place. There has been much work of this kind about *Kenſington Palace*. For ſuch intentions, great care is to be taken that healthy materials are uſed, otherwiſe the *rot* may be brought to the houſe if there be no area; or if there be, it often creeps along the planks or other ſupporters of ſtone ſteps, or in ſome neglected place, and then it will increaſe like the polypus, if it finds any moiſt and decayed matter, on which it can fix. Of whatever materials ſuch ground is compoſed, a long time paſſes before it is perfectly dry or ſettles firmly. It is apt to be moſſy, emitting a peculiar, and not an agreeable ſmell, on the evening of a hot day, perhaps for a hundred years after it was layed.

It has been much the faſhion of late, to fix to the freehold many pieces of furniture, as wardrobes and the like; but in houſes ſubject to the *rot*, this ſhould be ſtudiouſly avoided.

Almoſt every perſon can recollect the ſtate of much of that ground in the vicinage of *London* which is now covered with fair or magnificent houſes. How the timber may ſtand in many of theſe, cannot as yet be aſcertained, but the proſpect is, for many reaſons, unfavourable. The foundation of every houſe muſt be layed on the true natural ground, but this is not a ſufficient ſecurity unleſs care be alſo taken to procure healthy materials for filling up vacancies, and perhaps by firſt ſkimming off and clearing away any corrupted materials which have been laid on its ſite. I doubt it is the

practice

practice on theſe occaſions, to take as much of the gravel and better materials as can be diſpoſed of with advantage for other uſes, and then to fill up vacancies with the cheapeſt rubbiſh that can be gotten. But the expence and hazard of this is generally left to the tenant or purchaſer of the houſe. A ſmall piece of ground behind a houſe bought by a gentleman I know, was ſo excavated, that at one time he paid fifty guineas merely for carting the ſcrapings of a turnpike road, before it was brought to a proper level. It is however very likely, by chooſing ſuch materials, that he has preſerved his houſe from the *rot*.

The diſtemper of which we are ſpeaking, is called by the general name of *rot*, or *dry rot*, but it may perhaps be diſcovered, at ſome future time, that there are many varieties both of the diſtemper and its cauſes. The prevailing opinion is well known that it is a ſpecies of vegetation, but without deciding with ſufficient accuracy upon the primary or prediſpoſing cauſe, or what the nature of that vegetation is. Some have ſuppoſed it to be of the animal kind, and probably becauſe of the obſervation that places in which ſnails have been decayed, do not fail to produce muſhrooms; which has led, if I miſtake not, to a doubt whether muſhrooms were of the animal or vegetable tribe; or becauſe no man has yet been able to diſtinguiſh where the animal kingdom ends and the vegetable begins, or that no language can exactly define an animal from a vegetable, though every one can clearly diſtinguiſh them in his own mind. The firſt effect which earth capable of producing the *rot* ſhews, is in its being continually moiſter than healthy earth, but the moiſture is not the ſubſtance of the diſeaſe, no more than the matter of the ſmall-pox is the infecting principle, which is of the moſt ſubtle nature, and only mixed or enveloped with the matter as its vehicle. So the moiſture in earth impregnated with the *rot*, does not ſeem to be the principle of the *rot*, but it is merely the vehicle or conductor of the miaſmata or primary principles of that diſtemper. It would be worth while to try ground which produces the *rot*, as well as wood affected by it, with electric experiments, whether it abounds with or is deficient in electric fire; but there is a multiplicity of things which an ingenious man, who could ſpare time, might try, for the purpoſes of inveſtigating either the cauſe or the effect of the *rot*; and if he had the ſagacity or good fortune to diſcover a certain method of preventing it, he would do a very eſſential ſervice to ſociety.

When timber becomes affected with the *rot*, it is the medullary part which firſt ſuffers, and as this lies in different portions in various parts of the timber, according to the ſtraightneſs or obliquity of the longitudinal fibres, ſo the blotches or tokens are of different ſizes, and ſcattered irregularly over the ſurface of the wood; but the ſawed ends or ſides of wood univerſally exhibit the firſt tokens of its being infected by producing the *fungus*. This, which as far as I know may have a proper name with naturaliſts, has exactly the ſmell, and ſomething of the look, of a common muſhroom, and this *fungus* is alſo ſometimes found behind pannels, yet I think never unleſs there be ſome acceſs for the air, and perhaps a certain degree of conſtant or occaſional moiſture. In ſome places I have found what might be called the ſkeleton of a *fungus*, when from the interruption of moiſture, or from its utter decay, the wood was no longer capable of ſupporting or renewing that which had been before formed. When the *rot* mantles over a brick wall, it has much the appearance of a thick ſpider's web, and in its principal ſeat, where it has materials enough to work upon, or by which it can be nouriſhed, and where it is not for a long time interrupted, there is uſually found a large congeries of ſtuff of the ſame kind; not, I apprehend, formed without order, but lying regularly in *ſtrata*. All theſe ſhould be obſerved with more care, and ſo important a circumſtance as the *rot* or cancer in wood, as it may be called, ſhould not be ſuffered to paſs longer with ſo little attention.

I cannot conclude theſe obſervations, ſlight as they are, without taking ſome notice of the means which have been deviſed or practiſed for preventing the *rot*, by applications to the timber itſelf; with a view of rendering wood impervious to, or capable of reſiſting its influence. The principle of all theſe means may be explained in two views; firſt, to fill up all the interſtices or cells of which timber is chiefly compoſed, with ſome unperiſhable matter, or by ſome contrivance to corrugate the timber, that the cells may be obliterated, or ſufficiently cloſed, ſo as not to admit of the diſtemper, ſomething in the manner of tanning leather; ſecondly, by ſoaking timber in ſome fluid impregnated with certain ſubſtances that ſhould act as an antidote to the diſtemper, though put into contact with it, or to render wood impenetrable by it.

Profeſſor *Graſſman* of *Stettin* has propoſed a method of rendering timber uſed in building ſhips more durable, and indued at the ſame time with particular powers to reſiſt the *worm*. Whether the profeſſor's method would, if it were practicable, have any power in preventing the *rot* in timber uſed in buildings, I cannot tell, but will beg leave juſt to mention it, according to my apprehenſions of its purport.

He adviſes the oaks to be felled green, that is while the ſap is riſing, and then the timber to be made and kept perfectly dry, for ſo long a time that all its native moiſture may be exhaled. The timber is then to be ſoaked in a ley prepared from mineral coal and turf, and ſo loaded with ſtyptic or rather antiſeptic particles, that ſuch an additional firmneſs may be given to the timber as ſhall make it far more durable; and the materials with which it is imbued ſhall poſſeſs qualities ſo noxious to the *worm* as to deſtroy it, or render wood impenetrable by it. From what I have ſeen, this preparation of timber, though it might endure longer, would make a feeble reſiſtance to the *worm*, and would not be of any great ſervice againſt the diſtemper of which we are ſpeaking; not to mention that the proceſs is too intricate and expenſive to be practiſed with timber uſed in buildings.

While we are endeavouring to deſtroy or to ſuſpend the operation of the native principle which is ſuppoſed ultimately to cauſe the decay of timber, or to qualify it better for particular uſes, it behoves us to be careful that we do not in theſe attempts introduce other principles of decay; a circumſtance to which attention has not always been paid. On the whole, it may be doubted, whether by any ſuch means, greater advantage be obtained, than merely by keeping timber a ſufficient length of time before it is converted to its particular uſes.

It has been propoſed to ſoak timber intended for uſe in places liable to the *rot* in a ſolution of vitriol (copperas), or other ſubſtances of that kind, ſo long that it ſhall be impregnated with them through its whole ſubſtance. Of the effect of theſe methods I cannot ſpeak, having never ſeen them tried, but in my own opinion, no timber, however prepared, will long be able to reſiſt the *rot*, or do more than retard its progreſs.

Artificers are frequently called when the *rot* appears, to give their opinion and aſſiſtance in preventing its progreſs, and they gravely recommend it to be waſhed with copperas water, or water with new-ſlaked lime, and the like; and they are not to be blamed becauſe they know but little of what other people are ignorant. Theſe will often deſtroy the *fungus* which has appeared, and the knowledge of this effect from ſuch ſubſtances, may lead to the uſe of them, in the firſt inſtance, to the ground, or to ſtones layed over ſuch ground; though ſcorching the part affected with a hot iron would be, in many caſes, a preferable method. But the truth is, the timber is gone before the *fungus* makes its appearance, ſo that every method of this kind muſt of neceſſity fail.

It being therefore evident that the *rot* is incurable by any method with which we are now acquainted, all our attention is to be employed in diſcovering the moſt effectual means of preventing the diſtemper; and with this view I hope the preceding obſervations may not be altogether uſeleſs.

THE END.

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